

REMARKS

Claims 1, 3, 4, 8, 10, 12, 15-17 and 25-65 are pending in this application. Claims 1, 25, 46 and 49 have been amended. The specification has been amended to correct a minor typographical error and to identify flexible bladder 250. No new matter has been introduced.

Claim 49 stands objected to under 37 CFR § 1.75(c) as being of "improper dependent form." (Office Action at 3). Claim 49 has been amended to depend on claim 47. Applicants thank the Examiner for pointing out this error.

Claims 1, 25-29, 31, 32, 46, 47 and 49 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Falter (U.S. Patent No. 1,935,672). Applicants respectfully traverse this rejection.

Amended independent claim 1 recites an "arrangement for generating hydrogen gas" comprising "a catalyst chamber comprising a catalyst," "a fuel chamber comprising a reactant material capable of generating hydrogen gas when contacting said catalyst," and "a spent fuel chamber connected to the catalyst chamber for receiving product material and hydrogen gas generated by contacting the reactant material and the catalyst." Amended independent claim 1 also recites "a gas conduit between the spent fuel chamber and the fuel chamber, the conduit including a check valve" and "an outlet conduit connected to the gas conduit."

Amended independent claim 25 recites an "[a]pparatus for use in a system for generating hydrogen" comprising "a fuel container having an internal pressure," "a reactant material capable of generating hydrogen disposed within said fuel container, said fuel container having an outlet port which can be opened and closed, said internal pressure pushing said reactant material through said outlet port when it is open," and

“a product container.” Amended independent claim 25 also recites “a gas conduit between the product container and the fuel container.”

Amended independent claim 46 recites an “arrangement for generating hydrogen gas” comprising “a catalyst chamber comprising a catalyst,” “a fuel chamber configured to retain a reactant material under a predetermined pressure, said reactant material capable of generating hydrogen gas when contacting said catalyst” and “a spent fuel chamber connected to the catalyst chamber for receiving product material and hydrogen gas generated by contacting the reactant material and the catalyst.” Amended independent claim 46 also recites “a gas conduit between the spent fuel chamber and the fuel chamber.”

Falter refers to an arrangement comprising a chamber (2) containing a reactant material, a reaction chamber (1), a product separation apparatus including condensers (23) and gas scrubbers (27) connected to the reaction chamber (P1/L50-55) and to a product collection receiver (25), which receives the product from the contact of the reactant material with a catalyst. Falter also refers to a spent liquor receiver (4) which receives spent material from the reaction chamber, and a conduit (28) for returning unconverted reagent to the reagent chamber.

Falter fails to anticipate the subject matter of claims 1, 25-29, 31, 32, 46, 47 and 49. In contrast to amended independent claim 1, Falter does not disclose “a gas conduit between the spent fuel chamber and the fuel chamber”; nor does Falter disclose that any such conduit includes a “check valve.” In Falter, neither the spent liquor receiver (4) nor the product collection receiver (25) is connected by a conduit to reagent chamber (2). In addition, scrubbers (27) of Falter are used to remove gaseous product (e.g., acetaldehyde) from the unconverted reactant material (e.g., acetylene). In Falter, the product is collected in product collection receiver (25) connected to the scrubbers and

condensers via conduit 24 (P2/L52-78). Thus, conduit 28 of Falter returns recovered reactant material to chamber (2) (P2/L78-82), and does not connect product receiver (25) to the reactant chamber (2).

Further, cock (29) of Falter which is provided in conduit line (28) to allow gas to be vented is not a "check valve," as in the claimed invention.

Falter also fails to disclose all limitations of amended independent claims 25 and 46. Falter does not disclose any "gas conduit between the product container and the fuel container" or "a gas conduit between the product container and the fuel chamber," as claims 25 and 46 respectively recite. In Falter, the reactant material chamber (2) is connected to a series of scrubbers (27) for removing gaseous product (e.g., acetaldehyde) from the unconverted reactant material (e.g., acetylene) via conduit 28. However, the reactant material chamber (2) of Falter is not connected to either product collection receiver (25) or to spent liquor receiver (4).

For at least these reasons, Falter fails to anticipate the subject matter of claims 1, 25-29, 31, 32, 46, 47 and 49, and withdrawal of the rejection of these claims is respectfully requested.

Claims 1, 25-29, 31, 32, 46, 47 and 49 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Fuderer (U.S. Patent No. 4,553,981). Applicants respectfully traverse this rejection.

Fuderer refers to a system for purification of a hydrogen gas stream (col. 1. lines 6-10) comprising a conduit processing line (1) for passing a hydrocarbon to a conversion means (2) such as a steam reformer, partial oxidation unit, or coal gasification unit (col. 4. lines 58-61) to generate a hydrogen effluent gas stream.

According to Fuderer, the hydrogen effluent gas stream is then passed to a secondary conversion means (5) such as a water gas shift reactor, to purification means scrubber (7) and pressure swing adsorption system (9), to remove impurities such as carbon monoxide and carbon dioxide (col. 5-6).

Fuderer fails to anticipate the subject matter of claims 1, 25-29, 31, 32, 46, 47 and 49. Fuderer does not disclose, teach or suggest "a fuel chamber," or "a gas conduit between the spent fuel chamber and the fuel chamber, the conduit including a check valve," as independent claim 1 recites. In Fuderer, the waste gas isolated by the purification means is collected and compressed in recycle compressor (13). The compressor is connected by conduits (21, 22, 23) to hydrocarbon conversion means (2) and shift conversion means (5) (col. 5, lines 14-15 and 37-42). There is no indication, however, that compressor (13) of Fuderer is connected to any fuel chamber, and no such chamber is taught by Fuderer. Fuderer also fails to disclose, teach or suggest a "check valve," as in the claimed invention.

Fuderer further fails to disclose or suggest "a gas conduit between the product container and the fuel container" and "a gas conduit between the product container and the fuel chamber," as claims 25 and 46 respectively recite. No fuel container or chamber is taught by Fuderer. In addition, the waste gas in Fuderer is collected and compressed in recycle compressor (13), which is connected by conduits (21, 22, 23) to either the hydrocarbon conversion means (2) or the shift conversion means (5), and not to a fuel container or chamber. For at least these reasons, the subject matter of claims 1, 25-29, 31, 32, 46, 47 and 49 is not anticipated by Fuderer, and withdrawal of the rejection of these claims is also respectfully requested.

Claims 1, 25-29, 31, 32, 46, 47 and 49 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Kojima et al. (U.S. Patent Application Publication No. 2001/00229600). Applicants respectfully traverse this rejection.

Kojima refers to a hydrogen generating apparatus comprising a fuel storage tank (1) containing a reactant material capable of generating hydrogen connected to a catalyst chamber (2) via a pipe (3). Kojima also mentions that the pipe is provided with a throttle valve (6) for controlling the flow of reactant material (see [0074]) to the catalyst chamber. According to Kojima, pipe (7) carries product materials and unreacted reactant material from the catalyst chamber to a hydrogen separator (8), wherein hydrogen is removed from the system and supplied to a reaction cell [0075] and the reactant material is returned to the fuel storage tank (1) via pipe (9) [0076].

Kojima fails to disclose or suggest all of the limitations of claims 25-29, 31, 32, 46, 47 and 49. Kojima fails to disclose "a gas conduit between the product container and the fuel container" or "a gas conduit between the product container and the fuel chamber," as claims 25 and 46 respectively recite. The hydrogen separator (8) of Kojima is connected to the fuel storage tank by pipe (9), which is configured to transport the metal hydride aqueous solution (e.g., the reactant material) [0074, 0076]. This pipe is not "a gas conduit between the product container and the fuel" container/chamber, as in the claimed invention.

Kojima therefore fails to anticipate the subject matter of claims 25-29, 31, 32, 46, 47 and 49. Withdrawal of the rejection of claims 25-29, 31, 32, 46, 47 and 49 is also respectfully requested.

Claims 25-29, 31, 32, 46, 47 and 49 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Amendola et al. (U.S. Patent Application No. 2003/0037487) ("the '487 publication"). Applicants respectfully traverse this rejection.

The '487 publication is directed towards a system for hydrogen generation comprising a first container and a second container, a catalyst system, and *a pumping system*, where a pump is commonly known as a mechanical device that moves fluid (see section [0043]). The present invention is directed towards a system for hydrogen generation that does not require a pumping system (see specification at [0021]), as the difference in pressure between the fuel container and the spent fuel container causes fuel flow through the catalyst without requiring any mechanical device.

The '487 publication thus discloses a system incorporating a "flexible" or "collapsible" fuel tank, and the use of "external" pressure. That is, a pressure or force that is applied to the fuel tank as a whole. In contrast, the claims of the present application recite "a gas conduit between the product container and the fuel container" (claim 25) and "a gas conduit between the spent fuel chamber and the fuel chamber" (claim 46), to allow hydrogen gas to be transferred directly to the fuel tank, and allow an "internal" pressure, that is, a pressure within the fuel tank, to act on the fuel solution directly. This connecting gas conduit is not present in the systems of the '487 publication, and the two chambers in the systems claimed in the '487 publication are only in communication via the fuel conduit and catalyst chamber. Therefore, this § 102(e) rejection is overcome and should be withdrawn.

Claims 25-29, 31, 32, 46, 47 and 49 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Amendola et al. (U.S. Patent Application No. 2004/0033194) ("the '194 publication"). Applicants respectfully traverse this rejection.

The '194 publication is directed towards hydrogen generation systems that comprise a fuel reservoir wherein *the spent fuel is introduced into the reservoir and mixed with the fuel solution*. As shown in Figures 8 and 9, the systems in the '194 publication include a solution storage tank and a reaction chamber. Paragraphs [0067] and [0068] of the '194 publication describe moving the sodium borohydride solution, either with gas pressure or a pump, to contact the catalyst and generate hydrogen gas and a borate compound as shown in equation (1) in [0027]. The borate compound is a water soluble solid state and no removal mechanism is disclosed in this system. In contrast, the present invention claims systems that comprise two separate chambers for the fuel and product, such that "the fuel and spent fuel are separated from each other avoiding constant dilution of the fuel concentration." Therefore, this § 102(e) rejection is also overcome and should be withdrawn.

Claims 25-29, 31, 32, 46, 47 and 49 stand provisionally rejected under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-34 of co-pending Application Serial No. 09/900,625 ("the '625 application"), filed on July 6, 2001. As this rejection is provisional, Applicants will respond to it upon the indication of allowable subject matter.

Claims 25-29, 31, 32, 46, 47 and 49 stand provisionally rejected under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13 of co-pending Application Serial No. 10/638,651 ("the '651 application") filed on August 11, 2003. As this rejection is provisional, Applicants will respond to it upon the indication of allowable subject matter.

Claims 1, 25-29, 31, 32, 46, 47 and 49 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-18 of co-pending Application Serial No. 10/223,871 ("the '871

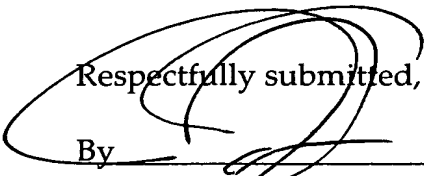
application”), filed on August 20, 2002. As this rejection is provisional, Applicants will respond to it upon the indication of allowable subject matter.

Claims 25-29, 31, 32, 46, 47 and 49 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-28 of co-pending Application Serial No. 10/359,104 (“the ‘104 application”), filed on February 5, 2003. As this rejection is provisional, Applicants will respond to it upon the indication of allowable subject matter.

Claims 25-29, 31-32, 46-47 and 49 stand provisionally rejected under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-45 of co-pending Application Serial No. 10/115,269 (“the ‘269 application”), filed on April 2, 2002. As this rejection is provisional, Applicants will respond to it upon the indication of allowable subject matter.

The pending claims are believed to be in condition for immediate allowance. If anything further may be required to place these claims in even better form for allowance, the Examiner is cordially invited to telephone the undersigned attorney for Applicants.

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Respectfully submitted,

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